

XIII. *Review of the Order of Hydrophyllæ.* By GEORGE BENTHAM,
Esq., F.L.S.

Read June 17th, 1834.

ON the occasion of publishing some new ornamental species of *Nemophila* and *Phacelia*, received by the Horticultural Society from Mr. Douglas, the collector whom they had sent out to the North-west Coast of America, I have been led to examine the whole of the species of the small tribe to which they belong, contained in my own and the Horticultural Society's herbaria. The result having induced me to entertain some doubts as to the importance of some of the characters upon which the generic distinctions have been established, I have committed my observations to paper, together with a short review of the whole of the species of which the order is now composed, in the hope that they might not prove unacceptable to the Linnean Society.

This group of plants was first indicated as a natural order by Mr. Brown in his *Prodromus Floræ Novæ Hollandiæ*, where, with his usual acumen and conciseness, he observes (p. 492.), "Distincti (a *Borragineis*) ordinis initia constituunt genera capsularia *Hydrophyllum*, *Phacelia*, et *Ellisia*, ob albumen copiosum cartilagineum, et folia composita vel alte lobata." To this group Mr. Brown afterwards gave the name of *Hydrophyllæ*, and added the *Nemophila* of Barton (Bot. Mag. 50. t. 2373.), and a new genus under the name of *Eutoca* (App. to Franklin's Voyage). These five genera, together with one I now propose to name *Emmenanthe*, contain the whole of the thirty-two species now known; or if it should appear, upon further observation, that *Nemophila* should be considered as a section of *Ellisia*, and *Eutoca* be joined to *Phacelia*, the whole tribe would be reduced to four natural and well-defined genera.

All these plants agree in those essential characters which, as stated by Mr. Brown, separate them from their nearest allies, the *Borragineæ*, that is to say, in their capsular fruit and copious albumen; and the structure of the

ovarium, as far as it goes, appears to be the best character that can be taken for generic distinctions. In order to show how far any others may be brought in aid, I shall proceed to examine them separately.

In general habit and foliage, the distinction between *Hydrophyllææ* and *Borraginææ* is not always so marked as appeared from the species first known. Several *Phaceliææ* and *Eutocææ* have exactly the habit of *Echium*, *Cynoglossum*, or *Anchusa*; and some of the latter genus have the leaves constantly entire, although the "folia composita vel alte lobata" do run through the greater number of species. Some *Nemophilææ* may be compared to *Asperugo*, which has frequently opposite leaves (though always entire) and the same fragile trailing stem. The rough hispid hairs are the same in both tribes. As amongst one another, *Hydrophyllum*, *Emmenanthe*, and *Nemophila* have each a peculiar habit; but *Eutoca* and *Phacelia* are so much blended together in this respect that it would be difficult to assign any character derived from the vegetative organs peculiar to either genus.

The gyrate inflorescence of *Borraginææ* may be very readily observed in *Hydrophyllum*, *Phacelia*, *Eutoca*, *Emmenanthe*, *Ellisia*, and in *Nemophila aurita* and *phacelioides*; but in the remaining *Nemophilææ* it is (as in *Asperugo*) axillary, and can therefore only serve as a specific, not as a generic character, and in the general description of the order it must be considered in the light of a subsidiary, not an essential character.

The calyx is usually the same as in the majority of *Borraginææ*, inferior, persistent, and deeply 5-cleft, but with this particularity, that in some instances the sinuses (as in some *Campanulacææ*) are furnished with reflexed appendages, resembling the erect divisions of the calyx in form, but smaller in size. As shown by M. Alphonse De Candolle in his *Monographie des Campanulées*, p. 11, these divisions do not indicate any organic modification in the composition of the calyx, but are merely owing to the prolongation of the united lateral nerves of two adjoining sepals, as is rendered evident by the nervation of the calyx of *Ballota*, *Marrubium*, *Leucas*, and other *Labiataææ* with more than five teeth to their calyx. The character derived from this circumstance must consequently be inconstant, and have little or no relation to general habit, as may be observed in *Hydrophyllum*, where it would separate *H. appendiculatum* from its close allies *H. canadense* and *virginicum*; and if

that be really the only distinction between *Nemophila* and *Ellisia*, it proves the expediency of uniting these two genera, more especially as in *N. parviflora* and *pedunculata* the appendages are sometimes scarcely perceptible, or even entirely wanting, and at other times nearly half as long as the calyx.

Ellisia Nyctelea has, indeed, another character, derived from the same organ, which distinguishes it from *Nemophila*, that is, the large size and expansion which it acquires after the fall of the corolla; but this, again, is but a character of *degree*, in respect of which the *Ellisia chrysanthemifolia* would stand intermediate between the two genera, and is not, therefore, available to separate them.

The corolla of *Hydrophyllææ* varies in general form from campanulate to rotate, showing but rarely (*Eutoca phacelioides*) an approach to the infundibuliform corolla of most *Borraginææ*. But these variations are slight, difficult to characterize, and so little in relation to general habit as to be unavailable for generic distinction.

I have never observed in *Hydrophyllææ* any trace of those corolline appendages, or squamæ, which may be termed *laminal*, from their position at the base of the limb of many infundibuliform corollæ, whether monopetalous (as *Borraginææ*), or polypetalous (as *Caryophyllææ*); but the *unguicular* or *tubal* squamæ are often remarkably prominent. These squamæ are analogous to those placed at the base of the tube of many *Borraginææ* (having at the same time ligular squamæ at the mouth of the tube), and to the annulus of hairs or scales in the tube of many *Labiataæ*.

The *laminal* squamæ are evidently of no organic importance, but mere excrescences of the petals, showing an approach to a transformation analogous to that by which the ligulæ are converted into anthers, but for a different purpose, whatever that purpose may be. But many circumstances might induce a supposition that the case may be different with regard to the tubal squamæ. Their origin is always below that of the stamina, and in some cases (as in *Emmenanthe* and some *Eutocææ*) they appear to be connected with the filaments of the stamina in a manner analogous to the abortive filaments in pentandrous *Caryophyllææ*, *Paronychieææ*, and *Amaranthaceææ*. On the other hand, like the ligular squamæ, although constant in form in the same *species*, they vary much in the most natural *genera*, such as *Ajuga*, *Salvia* and *Stachys*

in the *Labiatæ*, *Echium* in *Borraginææ*, or *Eutoca* and *Phacelia* in *Hydrophyllææ*, being present or absent in two species otherwise very closely allied. In *Hydrophyllææ*, their form is very variable. In general their centre is entirely blended with the corolla, and their broad dilated margins, embracing the basis of the filaments, are alone visible; but in the genus *Hydrophyllum* they appear to be constantly linear, adnate along the back, but free at the upper extremity and the margins. In *Emmenanthe* and some *Eutocææ*, as also in *Echium vulgare* and several *Cynoglossa*, they are reduced to ten very small orbicular squamæ, placed quite at the base of the corolla; and in *Eutoca grandiflora* and *parviflora*, *Phacelia fimbriata*, and some others, they disappear entirely, a transverse nerve connecting the base of the stamina alone indicating their usual position.

The stamina in all *Hydrophyllææ* are much alike, of equal size, and regularly divergent; their only differences are in the unimportant character of length and in the hairiness of the filaments. The anthers are always oblong or linear, with parallel cells.

The style, in several species, shows readily to the naked eye the real structure of those *Labiatææ*, *Borraginæææ*, &c., which are said to have a simple style, with two subulate stigmata. The style is, on the contrary, in fact bifid, each lobe bearing at the extremity a small stigma. The ovarium of *Emmenanthe* is covered with a glandular pubescence; that of all other *Hydrophyllæææ* is clothed with white erect rigid hairs. The style of *Phacelia* and *Eutoca* is usually more deeply cleft than in the other genera, but the latter character is very uncertain.

The placentation of the ovarium is of great importance in the generic distribution of *Hydrophyllæææ*. In *Hydrophyllum*, *Nemophila*, and *Ellisia* the two placentæ are broad, fleshy, line the whole ovarium, adhere at the top and basis only, being free from the parietes, and bear on their inner surface each of them from two to sixteen ovulæ placed in two vertical rows, one on each side of the central line. In *Eutoca*, *Phacelia*, and *Emmenanthe* the placentæ are linear or slightly dilated, and adhere more or less to the parietes along their central line, bearing on their inner surface from two to fifty or sixty ovulæ, arranged either in two rows, or covering the whole surface without any apparent arrangement.

As the fruit ripens, the broad placentæ of the three first-named genera con-

tinue to line the capsule without adhering to it, forming, as it were, an inner capsule, and at complete maturity dry up into a thin membrane. In *Eutoca*, *Phacelia*, and *Emmenanthe* they are converted into spurious dissepiments, which in some species meet in the centre so as to divide the capsule into two cells, and in *Emmenanthe* are, moreover, considerably dilated in the centre. In *Eutoca Mexicana* the adhesion with the parietes breaks off, and the fruit assumes the appearance of an unilocular polyspermous capsule with two central placentæ. The same thing appears to take place in *Phacelia fimbriata*, but I have not seen any capsule in a state far enough advanced to be certain of the fact.

The form of the capsule, ovoid or globose in most *Hydrophyllææ*, is oblong-linear and compressed in *Emmenanthe*.

The number of ovulæ appears to have been the character chiefly relied upon in the formation of the genus *Eutoca*, and is, indeed, the only one which separates it from *Phacelia*, there being two only to each placenta in *Phacelia*, and often a great number in *Eutoca*. This character, however, is very uncertain, and forms very unnatural groups, whether we draw the line at 2, 4, 6, or 8 to each placenta, or between the definite number, arranged in two rows on the one side, and the indefinite number, without apparent arrangement, on the other. The same character also, if applied to *Nemophila*, would dis sever *N. insignis* from *N. phacelioides*, and *N. pedunculata* from *N. parviflora*.

The seeds of all the *Hydrophyllææ* I have been able to examine appear to be the same as those of *Eutoca* described by Mr. Brown in the above-quoted Appendix to Franklin's Voyage.

From the above observations, and the characters of the six genera of which *Hydrophyllææ* are now composed, it would appear that *Hydrophyllum* is a very natural genus, though difficult to characterize. *Nemophila* and *Ellisia*, when taken together, are a natural group, but are separated by a purely artificial character, and the same thing may be said of *Eutoca* and *Phacelia*. *Emmenanthe* consists of but one species, so peculiar in its appearance and several characters that it will probably always remain distinct and well marked.

I now proceed to a short synopsis of the genera and species of which the order consists.

HYDROPHYLLÆ. *R. Brown.*

Calyx inferus, persistens, profunde 5-fidus, sinus sæpe appendiculis reflexis auctis. *Corolla* monopetala, hypogyna, regularis, breviter 5-fida, rotato-campanulata vel rarius subinfundibuliformis. *Stamina* 5, perigyna, lobis corollæ alternantia, æstivatione inflexa. *Antheræ* versatiles, biloculares, loculis parallelis longitudinaliter dehiscentibus. *Ovarium* superum, simplex, uniloculare. *Stylus* elongatus, bifidus. *Stigmata* 2, terminalia. *Placentæ* 2 à dorso liberæ vel parietibus adnatæ, facie interiore 2—multiovulatæ. *Fructus* capsularis, bivalvatim dehiscens, nunc unilocularis, placentis maximis capsulam implentibus, nunc semidissepimentis vix completis subbilocularis. *Semina* extus reticulata. *Albumen* copiosum, cartilagineum. *Embryo* conica, radícula ad hilum spectante.

Herbæ americanæ, more Borraginearum hispidæ. Folia sæpius lobata, alterna, vel inferiora opposita. Flores in racemis vel spicis unilateralibus scorpioideo-circinnatis subdichotomis dispositi, vel rarius in axillis foliorum solitarii pedunculati.

I. HYDROPHYLLUM. *Linn. Gen. p. 83.*

Squamæ corollinæ 5, lineares, dorso adnatæ, apice marginibusque liberæ. *Stamina* longe exserta. *Placentæ* maximæ, dorso liberæ, ovarium implentes, 2-ovulatæ.

Folia radicalia numerosa; caulina pauca alterna lata pinnatim vel palmatim dissecta. Racemi scorpioideo-dichotomi ebracteati.

1. *H. APPENDICULATUM* (*Mich. Fl. Bor. Am. i. 134.*), foliis infimis pinnatisectis, caulinis palmato-lobatis, racemis laxissimis, calycis hispidi sinus reflexo-appendiculatis.

Nemophila paniculata. *Spreng. Syst. i. 569.*

Folia radicalia fere *H. virginici*, suprema iis *H. canadensis* similia. Pedicelli calyce fructifero fere duplo longiores. Calyx *Nemophileæ*. Habitus omnino *Hydrophylli*. (*v. s. sp.*)

I have received this plant from Mr. Drummond, who gathered it in the Alleghanies.

2. *H. CANADENSE* (*Linn. Spec.* 208.), foliis palmato-lobatis angulatisve, florum cymis laxis, calycibus glabris.

H. canadense. *Bot. Reg.* iii. t. 242.

Folia late rotundata, utrinque glabra vel pilis raris hispida, lobis vix ad medium folii attingentibus, margine dentibus paucis argutis notata. Pedicelli calyce plerumque breviores. (*v. s. sp.*)

From Canada and Pennsylvania.

3. *H. VIRGINICUM* (*Linn. Spec.* 208.), foliis pinnatisectis, segmentis inciso-dentatis, florum cymis laxiusculis, laciniis calycinis anguste linearibus ciliato-hispidis.

H. virginicum. *Bot. Reg.* iv. t. 331.

Folia supra pilis sparsis hispidula, subtus pallida, glabra; segmenta 2—3-juga, inferiora subpetiolulata, suprema cum terminali sæpius confluentia. (*v. s. sp.*)

Received from Pennsylvania from Dr. L. de Schweinitz.

4. *H. CAPITATUM* (*Dougl. MSS.*), foliis pinnatisectis, segmentis inciso-dentatis, florum cymis densissimis, laciniis calycinis lanceolatis ciliato-hispidis. (*v. s. sp.*)

Found by Mr. Douglas, in 1826, in fissures of moist rocks in the interior of Columbia in North-west America. These specimens have the leaves hispid on both sides, the segments but little divided, and narrowed at their base. In other specimens, gathered in shady moist woods on the north-west coast, named *H. celestinum* by the same collector, the leaves are larger, with broader segments, much more cut, and the flowers fewer, differences naturally attributable to the locality. Again, the same plant occurs in the Californian collection, but with the leaves much more hispid on the upper surface, and covered with a whitish down underneath.

II. ELLISIA. *Linn. Gen.* i. 97.

Calyces exappendiculati. *Squamæ corollinæ* 10, breves, vel nullæ. *Stamina* corolla subbreviora. *Placentæ* maximæ, dorso liberæ, ovarium implentes, 2-ovulatæ.

Folia pinnatim dissecta, inferiora opposita. Pedunculi inferiores oppositifolii, superiores in racemo laxo unilateralis simplici dispositi.

1. *E. NYCTELEA* (*Lim. Gen. 97.*), petiolis exappendiculatis, foliis pinnatifidis, lobis subincisis, calycibus fructiferis valde auctis.

Calycis fructiferi segmenta ovato-lanceolata, acuta, foliacea, semipollicaria. (*v. s. c.*)

I only know this plant from specimens gathered in European botanic gardens. It is said to grow on the Potowmac in Virginia, and on the Missouri.

2. *E. AMBIGUA* (*Nutt. Gen. i. 118.*), “decumbens, ramosa; caule glabro subglauco, foliis hirsutis lyrato-pinnatifidis subsessilibus, segmentis sublan- ceolatis angulato-dentatis lobatisve, racemis oppositifoliis lateralibus terminalibusque, corollis parvis calyce vix longioribus, segmentis emarginatis.

“Common in alluvial soils on the banks of the Missouri.”

I am wholly unacquainted with this plant.

3. *E. MEMBRANACEA*, glaberrima, petiolis exappendiculatis, foliis pinnatifidis, segmentis integerrimis, calycibus vix auctis.

Folia tenuia, lobis divaricatis lato-lanceolatis obtusis. Flores parvi, pedicel- lati, laxi racemosi. Corolla alba. (*v. s. sp.*)

From Mr. Douglas's Californian collection.

4. *E. CHRYSANTHEMIFOLIA*, hispido-scabra, petiolis basi auriculato-dilatatis, foliis subbipinnatifidis, lobis inciso-dentatis obtusis, calycibus fructiferis parum auctis.—Flores *E. membranaceæ*. Corollæ squamæ dentatæ. (*v. s. sp.*)

From California. *Douglas*.

III. NEMOPHILA. *Barton.*

Calycis sinus dentibus reflexis appendiculati. *Squamæ corollinæ* 10, breves, vel nullæ. *Stamina* corolla subbrevia. *Placentæ* maximæ, dorso liberæ, ovarium implentes, 2—12-ovulatæ.

Herbæ annuæ, diffusæ, fragiles. Folia inferiora opposita, omnia pinnatifida. Pedunculi nunc axillares, uniflori, nunc pauci ad apices ramorum in racemis brevibus dispositi.

1. *N. PARVIFLORA* (*Dougl. MSS.*), foliis pinnatifidis, lobis paucis latis subdentatis, calycis sinubus breviter appendiculatis, corollis calycem vix superantibus, placentis 2-ovulatis.

Flores parvi. Calycis appendiculi sæpius brevissimi interdum evanidi, rarius post anthesin elongati. Squamæ corollinæ parvæ, angustæ. (*v. s. sp.*)

Received both from Mr. Douglas and Dr. Scouler from the Columbia.

2. *N. PEDUNCULATA* (*Dougl. MSS.*), foliis pinnatifidis, calycis sinubus breviter appendiculatis, corollis calycem vix superantibus, placentis 6-ovulatis. Habitus, calyx et corolla omnino *N. parvifloræ*. Folia angustiora, longius petiolata, lobis magis integris distinctisque. (*v. s. sp.*)

Gathered by Mr. Douglas on the Columbia.

3. *N. PHACELIOIDES* (*Barton, Fl. Amer.* 61.), petiolis exappendiculatis, corollis calycem breviter superantibus, calycis sinuum appendiculis lanceolatis ipsiusque dimidium æquantibus, placentis 2-ovulatis.

N. phacelioides. Bot. Mag. t. 2373. vix Bot. Reg.

The above character is taken from the figure and description in the Botanical Magazine, as I have not seen the plant. It appears very nearly allied to *N. parviflora*, differing chiefly by the flowers, which are twice as large as the larger appendiculæ of the calyx. The figure in the Botanical Register, vol. ix. t. 740, appears to me to represent the *N. insignis*.

4. *N. AURITA* (*Lindl. Bot. Reg. xix. t. 1601.*), petiolis basi auriculato-dilatatis, calycis sinuum appendiculis elongatis, corollis calyce duplo longioribus, placentis 2-ovulatis.

Folia dum opposita basi connata; lobi lanceolati integerrimi divaricati vel ad basin folii spectantes. Pedunculi ad apices ramorum subracemosi. Corolla fere pollicem diametro. (*v. s. sp.*)

From Mr. Douglas's Californian collection.

5. *N. INSIGNIS* (*Dougl. MSS.*), petiolis exappendiculatis, corollis calyce duplo longioribus, placentis 10—12-ovulatis.

N. phacelioides. Bot. Reg. ix. t. 740.?

Foliorum lobi utrinque 3—4, integerrimi vel incisi. Pedunculi folio lon-

giores. Corolla plus pollice diametro. Squamæ corollinæ basi villosæ.
(*v. s. sp.*)

From Mr. Douglas's Californian collection.

6. N. MENZIESII (*Hook. et Arn. Bot. of Beech. Voy.* 152.), "foliis omnibus pinnatifidis scabris, segmentis approximatis ovatis obtusis ciliatis subtridentato-lobatis, pedunculis oppositifoliis folio duplo longioribus, segmentis calycinis lanceolatis accessoriis minutis."

I have not seen this plant; and it does not appear that Hooker and Arnott, from whom I have borrowed the above characters, have examined the ovarium: but it is stated on the authority of Mr. Collie, who gathered the plant in California, that the capsule is polyspermous.

IV. EUTOCA. *R. Br. App. to Frankl. Voy.*

Corolla decidua. *Ovarium* ovoideo-globosum, piloso-hispidum. *Placentæ* lineares, dorso parietibus ovarii adnatæ, 4—multi-ovulatæ. *Capsula* dissepimentis incompletis, semi-bilocularis.

Herbæ annuæ? sæpius erectæ, habitu *Phaceliæ*, rarius diffusæ vel divaricatæ. Flores racemosi densi sessiles, vel laxi pedunculati, cymis unilateralibus simplicibus vel dichotomis.

1. E. DOUGLASSII, diffusa, foliis omnibus pinnatifidis, lobis ovatis subintegerimis, placentis 12—20-ovulatis.

Folia fere omnia radicalia, hispido-scabra, lobis utrinque 4—6. Caules florigeri adscendentes, basi foliis paucis instructi, apice nudi multiflori. Pedunculi elongati. Flores ampli fere *Nemophilæ insignis*, ad quam hæc planta habitu refert. (*v. s. sp.*)

From Mr. Douglas's Californian collection.

2. E. CUMINGII, erecta, scabro-pubescens, foliis elongatis pinnatisectis, lobis oblongis obtusis subincisis, placentis 6—8-ovulatis.—*E. brachylobæ* affinis.
(*v. s. sp.*)

My specimen, gathered in the Andes of Chili by Mr. Cuming (no. 313.), is very young, and so much pressed in the drying, that the ovarium was the only

part of the single flower I had which I could extract in a state fit for examination. The corolla appears to be shorter than the calyx.

3. *E. BRACHYLOBA*, erecta, scabro-pubescens, foliis elongatis pinnatifidis, lobis ovatis obtusis subincisis, placentis 6—8-ovulatis.

Folia petiolata, 2—3-pollicaria, lobis utrinque 6—2 vix ultra medium folii attingentibus. Pedicelli breves. Racemi dichotomi fere *Phaceliæ circinataæ*. (*v. s. sp.*)

From California. *Mr. Douglas.*

4. *E. MEXICANA*, diffusa, foliis ovato-oblongis inciso-pinnatifidis, lobis ovatis oblongisve utrinque glabris, placentis 6—8-ovulatis.

Racemi elongati, simplices. Flores pedunculati, duplo majores quam in *E. parviflora*, cui hæc planta cæterum affinis. Filamenta ut in ea pilosa, et squamæ corollinæ nullæ. (*v. s. sp.*)

Received from G. J. Graham, Esq., with a collection of about 400 beautifully dried Mexican plants gathered by him in the neighbourhood of the mines of Tlalpuxahua, and between that place and the city of Mexico.

5. *E. PARVIFLORA* (*Br. App. to Frankl. Voy.*), diffusa, foliis pinnatifidis trifidisve, superioribus quandoque indivisis, lobisque inferiorum ovatis oblongisve integerrimis utrinque hispidis, placentis 6—8-ovulatis. (*v. s. sp.*)

Phacelia parviflora. Pursh.

Received from Pennsylvania from Dr. L. de Schweinitz; and from the Alleghanies from Mr. Drummond.

6. *E. LOASÆFOLIA*, erecta, hispidissima, foliis ovatis pinnatifidis, lobis latis acutis inciso-dentatis, corollis calycem vix excedentibus, staminibus exsertis, placentis 6—8-ovulatis.

Habitus omnino *Phaceliæ*. Ex omni parte pilis longis rigidis pubescentia viscosa intermixtis hirsutissima. (*v. s. sp.*)

From California. *Mr. Douglas.*

7. *E. FRANKLINII* (*Br. App. to Frankl. Voy.*), “erecta, foliis pinnatifidis bipinnatifidisve, ovulis placentæ singulæ 20-pluribus.”

I have not seen this plant, but Mr. Brown's detailed description and figure leave nothing to desire in its history.

8. *E. MENZIESII* (*Br. l. c.*), erecta, foliis linearibus lanceolatisve integerrimis quandoque trifidis pinnatifidisve, placentis 20—multi-ovulatis.
E. multiflora. *Dougl. Bot. Reg. t. 1180.* *E. echioides* et *E. glomerata.*
Dougl. MSS. Planta latitudine foliorum et statura variabilis, at exemplaria Douglasiana cum caractere Browniano omnino conveniunt.
(v. s. sp.)

Gathered by Mr. Douglas on sandy dry soils in the interior of the Columbia and California.

9. *E. SERICEA* (*Graham in Edinb. Phil. Journ. 1830, July, p. 172.*), "suberecta, foliis utrinque sericeis pinnatifidis, laciniis extrorsum incisis superioribus linearibus integerrimis, ovulis placentæ singulæ numerosis multis abortientibus, staminibus corolla triplo longioribus."

Raised in the Edinburgh garden, from seeds collected by Captain Franklin in his second Arctic expedition. I have not seen the plant, which is fully described by Dr. Graham.

10. *E. GRANDIFLORA*, adscendens, foliis lato-ovatis dentatis basi subcordatis, placentis ultra 50-ovulatis.

Caulis vel ramus in exemplare suppetente ultra pedalis, subsimplex. Folia sesquipollicaria, fere totidem lata, rugosa, uti caulis et calyces hispida. Racemi ad apicem plures, circinati. Calyces subsessiles. Corolla ultra $1\frac{1}{2}$ poll. diametro. Squamæ nullæ. Filamenta glabra. (*v. s. sp.*)

A single specimen of this handsome plant was sent by Mr. Douglas in his Californian collection.

11. *E. DIVARICATA*, caulibus dichotomo-divaricatis, foliis omnibus ovatis indivisis, placentis 12—20-ovulatis.

Folia omnia alterna. Racemi multiflori, unilaterales. Flores subsessiles. Calyx fructifer valde auctus. Corolla pallide cœrulea, calycem paullo excedens. (*v. s. sp.*)

From California. *Mr. Douglas.*

12. *E. PHACELIOIDES*, erecta, ramosa, foliis omnibus ovatis indivisis integerrimis, placentis 4-ovulatis.

Habitus *Phaceliæ circinatæ*, at multo minor. Folia omnia alterna, petiolata. Racemi multiflori. Flores sessiles. Calyces hispidissimi. Corolla subinfundibuliformis, calycem parum excedens. Stamina intra tubum inclusa. (*v. s. sp.*)

From California. *Mr. Douglas.*

V. PHACELIA. *Juss.*

Corolla decidua. *Ovarium* ovoideo-globosum, piloso-hispidum. *Placentæ* lineares, sæpius dorso parietibus ovarii adnatæ, 2-ovulatæ. *Capsula* dissepimentis subcompletis pseudo-bilocularis.

Herbæ annuæ vel perennes, erectæ vel diffusæ. *Flores* racemosi densi sessiles, vel laxi pedunculati, cymis unilateralibus simplicibus vel dichotomis.

1. *P. MALVÆFOLIA* (*Cham. Linnæa*, iv. 495.), hispida, foliis late cordato-ovatis lobatis, calycinis laciniis lineari-spathulatis hispidis, exteriore maximo, staminibus exsertis.

Found by M. de Chamisso in California, from whose description the above character is taken, not having myself seen the plant.

2. *P. BRACHYANTHA*, foliis ovatis integerrimis indivisis vel basi lobulis 1—2 auctis, corollis calycem vix excedentibus, staminibus inclusis.

Habitus *P. circinatæ*. Flores fere *Eutocæ phacelioidis*, sed placentæ constanter 2-ovulatæ. (*v. s. sp.*)

Gathered by Mr. Macrae, collector to the Horticultural Society, at the baths of Collina in the Andes of Chili.

3. *P. CIRCINATA* (*Jacq. fl. Ecl.* i. 135. *t.* 91.), foliis pinnatisectis quandoque indivisis, lobis oblongis ovatisve integerrimis inæqualibus, corollis calyce plus dimidio longioribus, staminibus exsertis.

Heliotropium pinnatum. *Vahl.* *Hydrophyllum magellanicum.* *Lam.* *H. Aldea.* *Ræm. et Schult.* *Aldea pinnata.* *Ruiz et Pav.* *A. circinata.* *Willd.*

Phacelia peruviana. Spreng. *P. californica.* Cham. *P. heterophylla.* Pursh.
P. rudis. Dougl. (*v. s. sp.*)

Found on the Columbia by Mr. Douglas and Dr. Scouler; in California by M. de Chamisso, Douglas, Lay and Collie, &c; on Mount Orizaba in Mexico by Schiede and Deppé; in Peru by Ruiz and Pavon; in Chili by most of the collectors who have been there; and at the Straits of Magellan by Commerson and others.

4. *P. INTEGRIFOLIA* (*Torrey, Pl. Rocky Mount. 222. t. 3.*), foliis ovatis indivisis crenato-serratis, staminibus exsertis.

Banks of the Platte. *Dr. Torrey.* I have not seen the plant.

5. *P. CILIATA*, scabro-pubescent, foliis pinnatisectis, segmentis oblongis obtusis subpinnatifidis, calycis laciniis ovatis submembranaceis reticulatis margine ciliatis, staminibus corollam subæquantibus.

Folia fere *Eutocæ Cumingii*; habitus *Eutocæ brachylobæ*, at placentæ 2-ovulatae. (*v. s. sp.*)

From California. *Mr. Douglas.*

6. *P. RAMOSISSIMA* (*Dougl. MSS.*), scabro-pubescent vel hispida, foliis pinnatisectis, segmentis ovatis obtusis subpinnatifidis, calycis laciniis oblongis viridibus hispidis, staminibus exsertis.

Rami elongati, divaricato-ramosi, paucifoliati. Flores quam in *P. circinata* parum minores. (*v. s. sp.*)

Gathered by Mr. Douglas in California and on the Columbia.

7. *P. TANACETIFOLIA*, scabro-pubescent vel hispida, foliis bipinnatifidis, segmentis oblongis dentato-pinnatifidis, calycis laciniis oblongo-linearibus hispidis, staminibus exsertis.

Caules 1—1½-pedales basi ramosi. Flores cœrulei, parum minores quam in *P. circinata.* (*v. s. sp.*)

Sent by Mr. Douglas from California, where it appears to vary much in hispidity and in the size and number of the lobes of the leaves.

8. *P. BIPINNATIFIDA* (*Mich. Fl. Bor. Amer. i. 134. t. 16.*), “erecta, foliis pinna-

tifidis, laciniis inciso-lobatis, spicis plerumque bifidis oblongis multifloris, corollæ cœruleæ lobis margine simpliciusculis."

In the western woods of the Alleghanies and in Kentucky. *Michaux.* On the Missouri. *Torrey.*

From Michaux's figure, this plant, which I have not met with, has the habit of *P. fimbriata.*

9. *P. FIMBRIATA* (*Mich. Fl. Br. Amer. i. 134.*), assurgens, pilosiuscula, foliis pinnatisectis pinnatifidisve, laciniis integerrimis, racemis laxis, corollis fimbriatis, ovariis basi crassissimæ insidentibus.—Habitus *Eutocæ mexicanæ.* (*v. s. sp.*)

Communicated by Dr. Torrey, who gathered it in Kentucky. The specimens are, however, so much pressed and so young, that I am unable to determine whether there may not be some character in the capsule which might distinguish it from *Phacelia.*

VI. EMMENANTHE.

Corolla persistens. *Ovarium* oblongo-compressum, glanduloso-pubescentis: *placentis* linearibus, dorso adnatis (8-)ovulatis. *Capsula* semidissepimentis completis ad axin incrassatis pseudobilocularis.

1. *E. PENDULIFLORA.*—Herba elegans, erecta, ramosa, subviscoso-villosa. Folia alterna, pinnatifida, semiamplexicaulia, at basi non auriculata. Racemi numerosi, erecti, graciles, ante anthesin circinati. Pedicelli tenues, flore longiores. Flores penduli, 5 lin. longi. Calyces pubescentes, subviscosi. Corolla campanulata, alba vel flavescens? basi intus purpureo-maculata, et usque ad maturationem fructus persistere videtur. Squamæ 10, minutæ, ad basin corollæ. Stamina corolla breviora. Fructus placentæ ad axin demum incrassatæ ut capsula subquadrilocularis evadit. (*v. s. sp.*)

From Mr. Douglas's Californian collection.

Mr. Douglas's *Phacelia furcata* is a Polemoniaceous plant allied to *Gilia*, and probably a new genus. Many other *Polemoniaceæ* have so much the habit

of some *Hydrophyllæ*, that they are occasionally mixed in herbaria; but the slightest examination of the parts of fructification will at once distinguish them.

Since the first sheet of this paper was printed off, the first part of the seventh volume of the *Journal of the Academy of Natural Sciences of Philadelphia* has been received, in which Mr. Nuttall describes, page 111, a new *Hydrophyllum* under the name of *H. macrophyllum*, discovered by Dr. Short in the forests of Kentucky. From his description it appears to me to be the same as Douglas's *H. capitatum*; for which it is therefore requested Mr. Nuttall's name may be substituted, as having the priority of publication.

At the moment of sending the present sheet to press, the first part of the fifth volume of the *Transactions of the American Philosophical Society of Philadelphia* has reached us. It contains a paper of Mr. Nuttall's on the *Flora of Arkansas territory*, with the following new species of *Hydrophyllæ*:

ELLISIA MICROCALYX, glabriuscula, decumbens, foliis lyrato-pinnatifidis longe petiolatis, laciniis paucis (3—5) lateralibus obliquis inciso-dentatis intermedio trifido obtuso, floribus solitariis minutis.

ELLISIA RANUNCULACEA, subhirsuta, caule procumbente, foliis pinnatifidis subquinelobatis, superioribus tripartitis inciso-dentatis obtusis longe petiolatis, racemis secundis paucifloris.

PHACELIA HIRSUTA, caule erecto ramoso, foliis pinnatifidis superioribus sessilibus, segmentis integriusculis, calycis laciniis linearibus patentibus, corollæ lobis integris nudis, filamentis basi barbatis.

PHACELIA GLABRA, erecta, foliis pinnatifidis, superioribus amplexicaulibus ciliatis, segmentis integriusculis, calycis laciniis ovatis, corollæ lobis integris nudis, filamentis basi barbatis.